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LEPIDOPTERA TAKEN AT ST. FABIEN, QUE.

BY GUSTAVE CHAGNON, MONTREAL.

A small collection of Lepidoptera was made by the writer during the first five days of July last, at St. Fabien, Rimouski County, Que. Owing to the remoteness of the locality from the better collected districts, it was thought advisable to prepare for publication a list of the captures made.

St. Fabien is situated at about one and a quarter miles from the St. Lawrence River, and is separated from the latter by a narrow wooded hill about 300 feet high. A beautiful sandy road branches off the main public road, passes at the foot of the hill and leads to the beach. This road for nearly its whole length is thickly bordered with alder, birch, coniferous trees, herbaceous plants and flowers of different kinds, and forms an ideal spot for insects, especially for butterflies. This place was visited several times during the above period; unfortunately, the temperature was not always very suitable.

On the second of July an attempt was made to do some collecting at light, but without success, probably due to the coolness of the air. During the earlier part of the evening, before the lantern was set to work, a specimen of *Sthenopsis quadriguttatus* was seen hovering amongst the alder bushes and was captured. Another specimen was seen a few minutes later, but could not be taken.

The afternoon and the night of the following day were spent at Lac des Jones, one of the several lakes in the neighbourhood, and situated about four miles inland of St. Fabien. Some lively trout fishing was done during the greater part of the afternoon, and the evening was spent collecting at light, insects being fairly abundant; unluckily, a heavy rain-storm came down at ten o'clock and lasted until the following morning, when the return to St. Fabien was effected.

The captures were:

Papilio turnus L.—St. Fabien. Several examples were seen; all had a worn-out appearance.

Pontia napi L., var. *oleracea* Harris.—St. Fabien. One specimen.

Eurymus philodice Godart.—St. Fabien. One specimen captured ; saw two or three others.

Argynnis atlantis Edw.—St. Fabien. Common.

Brenthis myrina Cramer.—St. Fabien. One specimen much worn out.

Charidryas nycteis D. & H.—St. Fabien. Six specimens taken in one little spot, not seen elsewhere.

Phyciodes tharos Drury.—St. Fabien. Four specimens.

Basilarchia arthemis Drury.—St. Fabien. One small specimen.

Nomiades couperii Grote.—St. Fabien. This fine Blue was the most abundant butterfly, and could be seen at every minute fluttering along the roadside.

Pamphila palæmon Pallas.—St. Fabien. Four specimens taken ; all in bad condition.

Thymelicus mystic Scudder.—St. Fabien. Two specimens.

Thanaos brizo Boisd and Lec.—St. Fabien. One specimen.

Thanaos icelus Lintner.—St. Fabien. One specimen.

Hemaris diffinis Boisd.—St. Fabien. Several.

Sphinx kalmiæ Smith and Abbot.—Lac des Joncs.

Ceratomia undulosa Walker.—Lac des Joncs.

Smerinthus jamaicensis Drury.—Lac des Joncs.

Alypia langtonii Couper.—St. Fabien.

Apatela dactylina Grote.—Lac des Joncs.

Apatela superans Guenée.—Lac des Joncs. Three specimens taken.

Apatela interrupta Guenée.—Lac des Joncs.

Apatela grisea Walker.—Lac des Joncs. Five specimens were captured.

Apatela innotata Guenée.—Lac des Joncs.

Hadena vultuosa Grote.—Lac des Joncs.

Mamestra assimilis Morr.—Lac des Joncs.

Lomanalles eductalis Walker.—Lac des Joncs.

Bomolocha scutellaris Grote.—Lac des Joncs.

Melalopha apicalis Walker.—Lac des Joncs.

Datana ministra Drury.—Lac des Joncs.

Heterocampa biundata Walker.—Lac des Joncs.

Schisura leptinoides Grote.—Lac des Joncs.

Cerura occidentalis Lintner.—Lac des Joncs. Several examples were taken.

Habrosyne scripta Grosse.—Lac des Joncs. A good number of these moths were noticed around the camphouse before darkness had completely set in. They had a peculiar flight; they hovered with a slow up and down motion, much like crane flies sometimes do.

Pseudothyatira cymatophoroides Guenée.—Lac des Joncs.

Drepana arcuata Walk.—Lac des Joncs.

Falcaria bilineata Pack.—Lac des Joncs.

I am indebted to Mr. L. W. Swett for the identification of some of the following Geometridæ:

Taliedege montanata Pack.—Lac des Joncs.

Eupithecia russeliata Swett.—Lac des Joncs. Identified by Mr. Swett.

Eupithecia sp.—One specimen at Lac des Joncs. Remarkable for its long pointed fore wings.

Venusia cambrica Curtis.—Lac des Joncs. Four specimens. Identified by Mr. Swett.

Euchæca albobittata Guenée.—St. Fabien.

Rheumaptera hastata Lin.—St. Fabien. Very numerous along the roadside.

Petrophora ferrugata Clerck.—Lac des Joncs.

Petrophora fluctuata Lin.—Lac des Joncs.

Eufidonia notataria Walk.—Lac des Joncs.

Cymatophora brunneata Thunberg.—St. Fabien. Identified by Mr. Swett.

Cleora indicataria Walk.—Lac des Joncs.

Euchlæna effectaria Walk.—Lac des Joncs.

Metanema inatomaria Guenée. Lac des Joncs.

Azelina anctaria Hübner.—Lac des Joncs.

Calizzia amorata Pack.—Lac des Joncs.

Evergestis straminealis Hübner.—St. Fabien.

Phlyctania tertialis Guenée.—Lac des Joncs.

Pyrausta funebris Ström.—St. Fabien.

Pyrausta ochosalis Dyar.—St. Fabien.

Crambus hortuelius Hübner.—St. Fabien.

Crambus sp.—St. Fabien.

Olethreutes bipartitana Clemens.—St. Fabien.

Archips persicana Fitch.—St. Fabien.

Phalonia vitellinana Zeller.—St. Fabien.

Stenopsis quadriguttatus Grote.—St. Fabien.

ON THE GALL-MAKING MOTHS ON SOLIDAGO AND ASTER,
WITH DESCRIPTION OF TWO NEW SPECIES.

BY AUGUST BUSCK, WASHINGTON, D. C.

Gnorimoschema salinaris, n. sp.

Labial palpi typical in shape, whitish, liberally sprinkled with black and gray, without any black annulation just before the apex, such as found in the closely-allied *G. gallasolidaginis*, or at most with but a faint trace thereof. Face, head and thorax bluish-white, suffused with fuscous and brown scales. Fore wings elongate, pointed, narrower than in *gallasolidaginis*; coloration and pattern very similar to this species, with the rather sharply-defined basal light area extending along the dorsum and spreading out over the apical third of the wing, and with the large costal chocolate-coloured area as in this species, but with ill defined blackish markings on the dorsal edge near base, and with irregular, longitudinal blackish markings in the interior and apical part of the dark costal area, not found in *gallasolidaginis*. Cilia whitish, heavily daubed with black and brown. Hind wings light, ochreous-fuscous; cilia yellowish. Abdomen light fuscous, with the basal joints velvety-yellow above. Legs whitish, strongly suffused with black and brown; tarsal joints with rather well-defined light ochreous annulations at the tip.

Alar expanse: 20-24 mm.

Habitat: Boston, Mass. Miss Cora H. Clarke, coll.

Food-plant: *Solidago sempervirens* Linn.

U. S. Nat. Mus., type No. 13441.

This species makes very similar galls on the stalks of the salt marsh Golden-rod as *G. gallasolidaginis* makes on the upland dry species.

The adults are also very similar, and the present species has for several years been placed tentatively under Riley's name in the National Museum, partly because it was represented only by single or unbred specimens, and partly because Riley's species was supposed to be very variable. As a matter of fact, however, the true *gallasolidaginis* is rather constant in its colour and ornamentation, as indicated by a large series, bred during several years by the writer in the neighbourhood of Washington and of St. Louis, Mo., the original locality of Riley's types in the National Museum.

These specimens are all of the characteristic soft chocolate-colour, with the ornamentation produced solely by white dusting on the basal, dorsal and apical parts; they all have broader wings than *salinaris*; in *gallasolidaginis* the costa is more strongly arched, and the cilia gives a

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rounded appearance to the apex, which *salinaris* has more straight and pointed wings.

The lack of a well-defined black annulation before the apex of the labial palpi and the presence of the black, longitudinal markings on the fore wings are the most dependable characteristics of *salinaris* in differentiating it from *gallæsolidaginis* Riley.

The moths issued from September 1-7th.

Gnorimoschema subterranea, n. sp.

Labial palpi typical in form; pepper-and-salt-coloured. Antennæ with each joint black, brown and white in succession. Face and head whitish, suffused with brown and fuscous. Thorax brown, sprinkled with white. Fore wings rich reddish-brown, in some specimens chocolate, with a more or less irregular sprinkling of black and white atoms. Cilia whitish, sprinkled with brown. Hind wings yellowish-fuscous; cilia gray. Abdomen dark fuscous, with the three basal joints velvety ochreous above. Legs blackish-brown, sparsely sprinkled with white; tarsal joints with narrow white annulations.

Alar expanse: 12-20 mm., average 17 mm.

Habitat: Boston, Mass. Miss Cora H. Clarke, coll.

Food-plant: *Aster multiflorus* Aiton.

U. S. Nat. Mus., type No. 13386.

This species comes between *G. gallæsolidaginis* Riley and *G. Busckiella* Kearfott, both in size and ornamentation; it differs from the former in the absence of any trace of a lighter dorsal basal area on the fore wing, though in some specimens there is a faint approach to the other wing-pattern of this species. *G. Busckiella*, which also feeds on *Aster*, but which makes its gall on the upper branches of the plant, differs from the present species in its darker colour and the even sprinkling all over the wing of white scales. The galls of the present species are found just underground, or with their upper part just above ground, on the root-stocks of *Aster multiflorus*, with rootlets emitted from their lower end, and the annual shoot from their upper end. They are more or less spindle-shaped, about 15 mm. long by 6-8 mm. in diameter; woody, rather thick-shelled, the pupa filling nearly the entire cavity. The adult issues from a round hole previously prepared by the larva, but not plugged, as in the *Solidago* gall, merely covered by the outer skin, which is left unbroken by the larva.

Several galls (2-10) are often found together in a cluster on the same rootstalk.

Miss Clarke states that the galls are rather abundant, but not easily observed on account of their location, the more so as the *Asters* normally grow in the grass-sod, where it is not easy to dig.

Miss Clarke sent me a few of these galls in August; I asked her to get more, and, with her usual enthusiasm, Miss Clarke made a special trip to Boston from her summer residence and secured about 150 additional galls, which, during the first two weeks in September, produced a large perfect series.

Gnorimoschema gallaeasteriella Kellicott.

In Vol. XLI, p. 75, 1909, of THE CANADIAN ENTOMOLOGIST, the late Dr. Wm. Brodie, of Toronto, maintains that this name is a misnomer (he has it wrongly as *asterella* Kellicott), and that Kellicott was mistaken in his identification of the food-plant. Dr. Brodie even asserts that he can recognize Kellicott's woodcut of the gall as *Solidago latifolia*, not as *Aster corymbosus*.

In this I cannot agree with Dr. Brodie; Kellicott's figure may at least as well represent *Aster* as *Solidago*, and there is no reason to doubt that Kellicott did breed his species from *Aster*, as it has been bred repeatedly since from that plant. I have before me specimens from Miss Clarke, which were unquestionably bred from the white wood-aster, *Aster divaricatus* Liss. (*corymbosus* Ait.), near Boston.

On the other hand, I have many perfect specimens bred by Dr. Brodie and by Mr. A. Cosens, of Toronto, which, according to both these gentlemen, were bred from *Solidago latifolia* and *S. caesia*, and the species would thus seem to infest both *Aster* and *Solidago*.

ON THE GENUS MASTOR, GODMAN AND SALVIN.

BY KARL R. COOLIDGE, PASADENA, CALIFORNIA.

Godman and Salvin, in the Biologica Centrali-Americana, Rhopalocera, Vol. 2, p. 567, 1893, erected the genus *Mastor* for the reception of three species, *Pamphila* (*Hesperia*) *bellus* Edwards, and two new species, *M. perigenes* and *M. anubis*, the latter being named as the generic type. *Mastor* is characterized as having the primaries fairly short, truncated somewhat apically, in this respect approaching *Poanes* and *Poanopsis*, from which it differs in a longer crook to the antennae, the club slenderer, and the primaries less rounded at the tip. The third joint of the palpi is short

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and bluntly conical. The primaries have the costa arched basally; the cell nearly two-thirds the length of the costa; the discocellulars strongly oblique, the upper one twice the length of the lower, and the latter somewhat shorter than the third median segment; lower radial depressed basally; first branch arising slightly beyond middle of median nervure, and the second shortly before lower cell angle. Secondaries slightly lobed at anal angle; the discocellulars weak. Body rather slender. Middle tibiæ conspicuously spined; hind tibiæ with two pairs of spurs. A narrow oblique band on primaries of males, extending from base of second median branch to the middle of the submedian nervure.

In addition to the three species above mentioned, *Pamphila phylace* Edwards (Field and Forest, Vol. 3, p. 117, 1877) falls in this genus. Dyar, in his "Review of the Hesperidæ of the United States," Journ. N. Y. Ent. Soc., Vol. XIII, p. 133, 1905, gives the following synopsis of the genus *Mastor*:

Head and collar golden, fringes sordid pale.....*phylace*.
Head, collar and fringes golden.....*bellus*.

Mastor phylace Edwards.—Originally described from Colorado, and has since been recorded from Arizona and New Mexico. Little seems to be known of it.

Mastor bellus Edwards.—Published in Papilio, Vol. 4, p. 57, 1884, from specimens taken by Morrison in Southern Arizona. Dr. Barnes, Ent. News, Vol. XI, p. 331, 1900, writes that "A number of specimens of this species taken this year in the Huachuca Mountains, are, I believe, the first taken since Morrison got the types many years ago." Godman and Salvin, however (1893), reported it from Las Vigas and Milpas, in Durango, Mexico.

During the past season I found *bellus* one of the most abundant species of butterflies occurring in the Huachuca Mountains, of Cochise County, Arizona. My first specimen was taken on May 25. From May 27 on it appeared more and more commonly until about the middle of July, when it gradually disappeared. It is two-brooded, the second normally appearing towards the last of July. *Bellus* does not appear to be restricted by elevation, as I took examples at less than 5,000 and at over 8,000 feet. June 21, at 7,800 feet, I observed a female ovipositing, and secured three eggs. They were laid on the ventral surface of blades

of grass, singly. Colour, a pale creamish-white, assuming a darker tinting as the young embryo develops; hemispherical, rather low, the base broadly flattened. The egg appeared to be marked with vertical ridges, but I could not make sure of this with a low-power glass. Just before the emergence of the young larva the egg is opaque, the black head of the larva being plainly visible. One egg hatched July 3, another July 8, and the third July 9. The young larva at once attacks the egg, devouring all but the basal portion.

Young larva.—Length, about 1 mm.; body cylindrical, slender, tapering from the middle quite rapidly posteriorly, and less so anteriorly; head jet black, large, subglobular, about one-third larger than middle of body; neck tightly strangulated; colour of body pale yellowish-white, sparsely covered with rather long concolorous hairs; legs and prolegs same colour; a greenish tint is assumed as the larva begins to feed. The first moult takes place in from three to five days.

After first moult.—Length, about 2.5 mm; head as before, but now only slightly larger in breadth than body; body as before, but the colour a rather dark grassy green, the three posterior segments with a somewhat yellowish tinge; legs and prolegs greenish-yellow. The larva forms a nest at the apex of the blade, drawing the edges together by fine white strands, the distance of the tube thus formed varying according to the age of the larva. The larva appears to be able to walk as readily backwards as forwards. Although I found many eggs and larvæ, I did not succeed in bringing the latter past the second instar.

Mr. Victor L. Clemence has given me several examples of the second brood of *bellus*, taken July 18 and 26, in the Chiricahua Mountains, Cochise County, Arizona. These have the fringes of a pale, dirty, creamish colour, answering perfectly to the description of *phylace* Edwards. It is thus obvious that *bellus* is the first brood and *phylace* the second, the latter having seven years' priority. But as representatives of the two broods are so strikingly distinguishable, it is appropriate that the first brood can be termed form *bellus* and the second *Mastor phylace*. *M. anubis* Godman and Salvin, described from Orizaba, Jalapa and Omilteme, in Guerrero, Mexico, is very probably a synonym of *phylace*, but as I only know it from the very brief original description, I cannot be definitely sure of this. *Mnaseas (Thymelicus) bicolor* Mabille, from Mexico and Central America, may be another species that will have to be referred to the synonymy of *phylace*.

NOTES ON DIABROTICA AND DESCRIPTIONS OF NEW SPECIES.

BY FRED. C. BOWDITCH, BROOKLINE, MASS.

During the last two summers I have made the following notes on Mr. Baly's paper. (Baly's Sec. 1 Trans. Ent. Soc., 1890.)

Among the species labelled *Lacordairei* Kirsch, in the 1st Jacoby collection I separate three examples as the true *fraterna* Baly, described from Guatemala; the form is long, narrow and parallel, and in the ♂ the fourth joint of the antennæ is as long as the first three joints; some of the forms classed by Jacoby as *Lacordairei*, especially those collected by Champion, have a black anal segment, which would seem to throw them out of this species. Mr. Baly, p. 7, speaks of the entirely black legs of *Lacordairei*; the Central American forms in the Jacoby collection have base of femora pallid.

Sanguinicollis Jac., Cist. Ent., II, p. 524, the type of which is in my collection, I place near *rugulipennis* Baly.

On page 25 Mr. Baly, speaking of *atomaria* Jac., says "the antennæ nearly equal to the body in length." Mr. Jacoby, in his description, P. Z. S., 1889, p. 284, says "the antennæ about half the length of the body." My example from the Jacoby collection has the antennæ missing, another specimen from Venez (Caracas?) seems to be a ♀, the antennæ are half as long as the body.

D. pauperata Baly, p. 27. The typical form has two discoidal black spots, the first about the middle and the other about 1.5 mm. behind. Specimens occur where the two spots are joined, forming a short discoidal stripe, this form also having the humeral vitta whole, thus producing a form resembling *atrilineata* Baly and its allies; other specimens have the discoidal spots entirely absent; in both these last forms the sutural spot is only a piceous line; all the 16 examples in my collection come from Bahia, Brazil, which is the typical locality for the species.

On page 38 *D. fulvofasciata* Jac. is given by Baly as a synonym of *tumidiconnis* Er., the description of the former given by Jac., P. Z. S., 1889, p. 281, speaking of the ♂ antennæ, "the second and third joints very short and equal, the fifth to the ninth joints greatly dilated and thickened," and the habitat Caracas. Baly, on pages 38-39, speaking of *tumidiconnis* Er., says of the ♂ antennæ, "the 2nd joint very short, the 3rd nearly one-half longer, the 4th longer than the preceding two united,

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the 7th and following two joints in the ♂ thickened," and the habitat Peru and Bolivia.

The differences given in the above descriptions are even more noticeable in the specimens themselves; the two forms are plainly distinct, and should not be united. I have one ♂ of each form from the type localities.

D. tibialis Baly, p. 79. This name being previously used by Jacoby in the *Biologia*, p. 512, should be changed to *confusus*.

D. variolosa Jac. (type in my collection) comes near *marginata* Sturm.

In identifying species of this genus, it should be borne in mind that the antennæ of the ♂'s are usually the longer, and the third joint in the ♂ is relatively shorter than the same joint in the ♀. The foveation of the thorax seems to me, in some instances at least, to be possibly a matter of sex. This, however, is more a suggestion for future research than a definite opinion.

The specimens sent me by Messrs. Staudinger and Bang-Haas as cotypes of *D. angustofasciata* Jac. in litt., belong to *Luperodes*.

D. suffusa Baly is not mentioned in Mr. Baly's paper. If it has been sunk as a synonym I have overlooked it. The Jacoby collection had it marked as a distinct species. I place it near *rugulipennis* Baly.

D. hahneli, nov. sp.

Black, base, and joints nine and ten of antennæ, thorax, femora and middle of first three abdominal segments yellow, elytra almost smooth, slightly plicate, with four white spots on each side placed 2-1-1. Length 7 mm.

Type collected by Dr. Hahnel, Amazons (Staudinger).

Form stout, head black, clypeal ridge not well defined, antennæ stout, more than half the length of the body, joint 2 short, 3 barely one-half longer, 4 much longer than the two preceding united, joints 1-3 flavous, tinged with piceous above, 9-10 and base of 11 flavous, thorax flavous, convex, shining, broader than long, a few fine punctures at the sides, lightly trifoveate, scutellum dark piceous, elytra shining black, very finely punctate, a round white spot back of the base, near the suture, a smaller one near the margin back of the shoulder, a small transverse spot back of the middle and a round spot at the apex, equidistant from the margin and suture; the inflexed edge of the elytra, behind the shoulder, is faintly piceous, body beneath black, excepting the thorax, the anterior breast and

middle of the first three segments of the abdomen, which are yellow (the black edge of these segments is about $1\frac{1}{2}$ mm. wide), legs with tibiae and tarsi black, coxae and femora yellow, with apex of the hind pair piceous. The form is very slightly dilated at the rear. The type specimen has the plication of the elytra slight but well marked. In addition to this specimen I separate another example marked by Jacoby as *Lacordairei*, labelled "Amaz.," which seems to be a ♂, and has the joints 2-3 of the antennae equal and the plication very slight; the colouring and form, however, are precisely similar. Should be placed in § A, Baly's paper; the coloration of the abdomen easily distinguishes it.

D. sancatarina, nov. sp.

Head black, antennae dark, with three basal and three upper joints flavous, thorax yellow, smooth, shining, elytra not plicate, black, tinged with greenish, shining, punctured, with the lateral margin, extreme apex excepted, and basal and apical round spots and median transverse spot flavous, below yellow, with pectus, tibiae and tarsi black. Length $6\frac{1}{2}$ mm.

Four examples from St. Catharina, Brazil (Mr. Klages).

♂ antennae three-fourths as long as body, joints 2-3 short, equal, 4 almost twice as long as both combined; shorter in ♀; with the joint 3 one-half longer than 2, and 4 not twice as long as both combined, three upper and three lower joints flavous, the tip of the last piceous, thorax one-half broader than long, convex, shining, impunctate on the disk, scutellum dark piceous, elytra shining, evenly and strongly punctured, slightly depressed along the suture at base, the epipleurae and inflexed margin yellow, the flavous colour vanishing when it reaches a point just behind the apical spot, which is round and equidistant from the suture and margin, the basal spot is round, discal and near the suture, the transverse spot is behind the middle and oblique, not attaining either the side or suture; one of my specimens has the elytra very obsoletely subplicate; belongs in § A, Baly.

D. funerea, nov. sp. (Jac. in litt.).

Piceous brown, with dark piceous, almost black head, elytra not plicate, each side with two round basal, one transverse submedian and one round apical white spots, antennae with joints 9-10 white, femora yellow, tibiae and tarsi colour of head. Length 5-6 mm.

Seven examples, all labelled Surinam, and deep orange-colour label.

Antennæ more than half the length of the body, joints 2-3 short, the latter slightly the longer, 4 equal to, or longer than the preceding two united, according to sex, colour light piceous, growing darker and becoming black on joints 7-8, eleventh white at base, black at tip, sometimes the tenth is piceous at the upper half; thorax about as broad as long, sides nearly parallel behind, smooth, convex, shining, piceous, a few fine punctures at the sides and obsolete traces of two foveæ, elytra piceous, shining, slightly dilated at the rear, finely and sparsely punctured, each with four flavous or white spots, the first round sub-basal near the suture, the second round sub-humeral near the margin, the third elongate sub-medial, transverse not attaining either suture or margin, the fourth round, apical, equidistant from the suture and margin; all below piceous, with the femora and abdomen flavous.

The species has been distributed with the manuscript name of *funerea* Jac.; three of my specimens were sent me as cotypes by Messrs. Staudinger and Bang-Haas. I have preserved this and some following names to save confusion. Sec. A, Baly.

D. fuscus, nov. sp.

Head black, antennæ piceous, joints 1-3 flavous, then gradually becoming piceous, 9-10 white; thorax yellow, transverse, disk smooth, convex, shining, faintly bifoveate, scutellum black; elytra plicate, black, thickly and evenly punctate, the lateral margin narrowly (extreme apex excepted), a round apical spot and an oblong submedian lateral spot yellowish-white, also from the middle of the base of each elytron to a point beyond the middle an ill-defined long yellowish-white mark not attaining the suture, body beneath yellow, breast black, legs yellow, tibiae and tarsi faintly piceous.

Four examples, Peru, green label (Callanga?). Length 6 mm.

Apparently a variable species, the form above described is a ♂, of which I have two examples practically alike, the other two are ♀'s, and have the flavous colour of the elytra diffused over the whole surface, leaving the suture narrowly dark and a humeral sublateral line of black, extending around the curve of the convexity and showing the two yellow spots above described, indicated by dark rings; other forms doubtless occur. The sides of the thorax are strongly sinuate and reflexed behind, the elytra are moderately dilated behind, especially in the ♀; the punctuation is coarse, thick, and in some places confluent. I place it near

decaspila Baly. The elytral pattern is almost exactly duplicated in some of the varieties of *10-guttata* Oliv., but the antennal joints at once differentiate it.

D. uncinata, nov. sp. (Jac. in litt.).

Head black, antennæ dark piceous, last three joints flavous, thorax rufous, shining, impunctate, except the sides, broadly depressed and lightly trifoveate, scutell black, elytra black, tinged with cyaneous, obsolete plicate, strongly dilated posteriorly, shining, punctate, with lateral margin dilated at the apex, a narrow curved fascia behind the middle, and suture narrowly from the fascia to the apex flavous, below black, with abdomen and bases of femora yellow. Length 6-7½ mm.

Three examples, Marcapata, Peru.

Antennæ three-fourths as long as the body, joint 3 one-half longer than 2, which is short, 4 longer than the preceding two united, four or five lower joints light piceous, the last three, apex of the eleventh excepted, flavous; thorax about as long as broad, sides very lightly sinuate, finely punctured at the sides, broadly depressed (one example very lightly) behind; the side foveæ small, but distinct, the third subobsolete, placed just before the scutell, which is dark piceous; the elytra differ in colour in each of the examples before me, black, black tinged with green, dark steel-blue; all, however, have the margin, apex and fascia and one the sutural border flavous, as above described; the form is broadly dilated at the rear, slightly depressed behind the scutell, surface evenly and moderately punctured, with a tendency to be semisulcate longitudinally, especially near the apex.

The species has been distributed with the manuscript name *uncinata* Jac. Two of my specimens were sent me as co-types by Messrs. Staudinger and Bang-Haas; one of them seems as if it might be a different species (*angustofasciata* Jac. in litt.?), as the fascia is almost transverse in place of being curved, and the thoracic depression is wanting; what I take as the type is the other example, having black elytra, a narrow curved fascia and depressed thorax, the longitudinal ridges of the elytra showing at the sides and rear, and the femora very slightly flavous at the base.

D. semiviridis, nov. sp. (Jac. in litt.).

Head, antennæ, legs and breast black, thorax greenish, flavous, convex, shining, very lightly foveate and punctate, elytra not plicate, prasinous, with a dash of orange, coarsely, confluent punctate, with a

humeral, and a common triangular, elongate sutural, and two or three small spots triangularly placed at the middle of each elytra black. Length 5-5½ mm.

Six examples, Marcapata, Peru, and also Bolivia (Mapiri?).

Resembles some of the forms of *10-punctata* Latr.; antennæ about three-fourths the length of the body, wholly black, joints 2-3 short and about equal in ♂, 3 a little longer in ♀, 4 longer than the preceding two united, noticeably so in ♂, thorax about as long as wide, convex, shining, sparsely, finely punctulate, very sparingly on the disk, two small foveæ faintly indicated, one on either side of the middle, sides nearly straight; scutel black; elytra slightly dilated at the rear, and depressed back of the scutel, punctuation finer behind; the elytra show a suffused orange-colour, which seems normally to be a cloudy vitta from the shoulder to the apex; in some examples it is almost wanting, and in others the orange tint suffuses nearly the whole elytra. The humeral spot is round, the sutural, elongate triangular, about 1 mm. long; there is a small round spot on the disk just before the middle, another between the last and the margin, but a little to the rear, and a third on the disk, in line with the first but about the beginning of the convexity, in some examples there are indications of a fourth spot between the last and the margin, and in others the third spot is absent; probably examples occur in which some or all the other elytral spots disappear; body beneath and legs black, except the abdomen and thorax are yellow.

The species has been distributed with the manuscript name of *semiviridis* Jac. Three of my specimens were sent me as cotypes by Messrs. Staudinger and Bang-Haas; the typical form I regard as the one with the three discal spots; distinguished from *10-punctata* Latr. by the coarse punctuation of the elytra, the thorax also seems to have the sides less sinuate.

D. piceopunctata, nov. sp.

Head, breast and scutel black, antennæ flavous, fuscous in middle and at end, thorax yellow, convex, finely punctate, elytra obsoletely plicate, bright yellow-prasinous, shining, with common sutural triangular spot, a humeral, two lateral, and a small, submedian discoidal spot, rufous piceous; body below yellow, legs yellow, with tarsi and outside of tibiae faint piceous. Length 5½ mm.

One example, San Augustin, Mapiri (M. Stuart).

Head with a sharp, round frontal fovea, antennæ about half the length of the body; joint 2 short, chubby; 3 one-half longer, more cylindrical; 4 as long as preceding two, 1-3 and base of 4 yellow, then dark piceous to the 9th, then flavous to the piceous upper half of the 11th, thorax broader than long, sides strongly sinuate, disk very obsoletely trifoveate, elytra scarcely dilated to the rear; punctures close and even, somewhat dulling the shiny appearance, the sutural spot is broad and abruptly attenuated to the rear, where it is drawn out as a thread-like line on the edge of the suture, gradually fading away about the middle, humeral spot, joining the sutural at the extreme base; the 1st lateral spot is large and round at the median side, and the 3rd lateral spot is on a line with the discal, and probably at times connected with it. The general effect is bright yellowish-green, with three basal and two lateral and a small hind spot rufous piceous. I place it next *atomaria* Jac.

D. neotromaculata, nov. sp.

Head and breast black, antennæ fuscous, thorax rufous, convex, shining, very finely and sparsely punctulate, elytra slightly plicate, dull orange, with a common triangular sutural spot, a broad humeral sublateral stripe extending to the middle and just before its end, extending inward toward the suture, and a curved fascia between the apex and middle, concave behind and not reaching either the margin or suture, all cyaneous blue, beneath and legs yellow, tibiæ and tarsi dusky brown. Length 5 mm.

One example, Rio Mixiollo, Prov. Huallaga, Peru (G. A. Baer, Aug. 8, 1900). Shape, size and general appearance of *atomaculata* Baly, but with black tarsi and tibiæ.

Head with well-marked frontal foveæ, antennæ $\frac{3}{4}$ length of body, joints 2-3 short, about equal (δ ?), 4 longer than both together; 5, 8 and 11 are darker fuscous; thorax longer than broad, lightly sinuate behind, the two ordinary foveæ are visible only at certain angles as minute depressions, punctuation of elytra moderately thick and even at the base and middle, becoming sparse towards the apex, the cyaneous markings have the appearance of being impressed, so that the yellow central parts seem slightly raised; the tibia and tarsi are about the colour of the darkest part of the antennæ.

The elytral markings are almost exactly those of *atomaculata* Baly, the colour of which is given in the description as black, but an example in my collection (ex Baly) has the markings blue-black, but the dark tibia and tarsi will at once separate the two.

D. bioculata, nov. sp.

Head, pectus, tibiæ and tarsi black, antennæ dark, lighter at base and apex, thorax yellow, with a few fine punctures, scutel yellow, elytra pale flavous, plicate, each elytron with two blue-black or cyaneous rings, one basal touching the suture and not the side, the other apical and not attaining either the sutural or margin. Length, 6-6.5 mm.

Type from Jalapa, four specimens Vera Cruz; Mex. two examples.

Similar in appearance to *biannularis* Har., but with black tibiæ and tarsi. Antennæ more than half the length of the body, with joint 2 short, 3 not half longer, 4 equal the two preceding, colour dark fuscous, the first three or four joints pale, also 10-11, excepting the apex of the last; thorax broader than long, more or less depressed and bifoveate, sides plainly sinuate behind; scutel yellow or piceous; elytra pale yellow, moderately and finely punctured, each with two blue or cyaneous rings which enclose a round yellow spot, femora yellow. This species has heretofore been confounded with *tibialis* Jac., and *biannularis* Har.; from the former it differs by the colour, size and sculpture of the thorax, and from the latter by the black tibiæ and tarsi; two of my Jalapa examples were in the first Jacoby collection as *biannularis* Har., and were collected by Hoege. They were gummed on cards, so the legs were not readily visible. Two others from the same locality among the Tring material and two from Vera Cruz, collected by Townsend.

(To be continued.)

OBITUARY.

We regret to record the death of Mr. Otto Seifert, who was stricken with cerebral apoplexy on Oct. 18, 1910, while planting flowers in his garden, and died two days later at his home, 230 West 2nd St., Mt. Vernon, N. Y.

Mr. Seifert was born in Hildesheim, Germany, on Feb. 26, 1848, and studied at the Goettingen University. He came to America in 1871, and for a number of years was engaged in the practice of pharmacy. From his earliest childhood he was a lover of nature, and later an enthusiastic entomologist, devoting all his leisure time to the study of Lepidoptera, the North American Arctiidae being his special favourites. He published several articles in various entomological journals, and was for many years a subscriber to the CANADIAN ENTOMOLOGIST.

He was a man whom all men loved and honoured, and his death is a great loss to his family and his many friends.

NOTES ON THE LIFE-HISTORY OF TWO SPECIES OF
CAPSIDÆ.

BY C. R. CROSBY, ITHACA, N. Y.

The brilliant red nymphs of *Heterocordylus malinus* Reut., and *Lygidea mendax* Reut., are found during May and June abundantly on the leaves and fruit of the apple in many parts of New York State.

The eggs of both species are laid during the summer, and are inserted their full length into the bark on the smaller branches, two-year-old wood being preferred. The eggs are very difficult to find, and I have not been able to make as many observations on them as desirable. All the eggs definitely known to belong to *H. malinus* were found inserted in slits in the bark at the base of the fruit spurs. As far as I have observed, the normal number of eggs for each cavity is four. Each egg is 1.6 mm. long by .4 mm. wide. It is rather strongly curved, slightly compressed and dull whitish in colour. The embryo develops in the lower enlarged portion, its head being some distance from the tip of the egg. The woody tissue of the bark, especially the outer portion, adheres so closely to the egg that it is impossible to remove it completely, even when hardened in alcohol.

The eggs of *L. mendax* are usually inserted in pairs in the lenticels of smooth two-year-old wood. They do not lie parallel to each other, but diverge at a wide angle in order to avoid the solid wood, since they are longer than the thickness of the bark. In size and shape they closely resemble the eggs of *H. malinus*.

The eggs of both species hatch soon after the opening of the apple buds, and the nymphs feed on the leaves and also attack the fruit as soon as it sets. In the Cornell Insectary I have reared both species to the adult stage exclusively on foliage.

As the nymphs grow older they become more active, and when disturbed retreat to the twig, where they adroitly dodge to the opposite side like a squirrel. They will frequently drop suddenly, but rarely fall to the ground, usually alighting on another branch. They have a curious way of getting a new hold. The posterior end of the alimentary canal can be extruded, and is covered with a viscid secretion. As soon as they strike an object in falling, this sticky organ adheres to it until the insect can regain its foothold. When confined in a glass bottle young nymphs become attached in this way so firmly to the glass that they cannot escape, and so perish.

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Both species pass through five immature stages, and attain wings at the fifth moult. Under natural conditions the time required for the nymphs to reach maturity varies considerably with the weather. In the Cornell Insectary, which is heated by steam, *H. malinus* required about 35 days, and *L. mendax* about 37 days. Under these conditions each stage lasted about one week. A longer time is required in the orchard.

The young nymphs of the two species are quite similar. Those of *L. mendax* may be distinguished by their brighter red colour, the absence of dusky markings on the thorax, and by having the body clothed with fine short black hairs. The nymphs of this species retain their bright colour until fullgrown, while those of *H. malinus* become nearly black on the thorax after the third moult. In the nymphs of *H. malinus* the beak is dusky, while in the other species it is nearly colourless, with a black tip.

DESCRIPTION OF THE NYMPHAL STAGES.

H. malinus.

Stage I.—Length, 1.2 mm. General colour a light tomato red. Each segment of the thorax has a large, transverse, medially interrupted dusky area, the one on the metathorax being smaller than the others and obliquely truncate laterally. Head dusky, with two oblique light lines, which on the vertex meet the median line of the thorax. Legs, antennæ and beak slightly dusky, the antennæ yellowish-red at the joints. As growth takes place the first and second abdominal segments shorten and the constrictions become deeper.

Stage II.—Length, 1.7 mm. Head dusky reddish. Thorax with the median line and the posterior margin of the pro- and mesothorax red, the rest dusky over a red ground colour. Abdomen tomato-red, with irregular lighter markings towards the sides; first segment with a broad transverse dusky spot, the second with a smaller one, the next six segments each with a very small spot, and the ninth with a large dusky area. Legs and antennæ dusky over a red ground colour. Beak dusky. Under parts tomato-red, except a small dark area just above the base of each leg.

Stage III.—Length, 2.2 mm. Head and thorax dull reddish. A small white area below and behind the eye. The wing-pads begin to show on the mesothorax. Abdomen with a median row of dull reddish spots, those on the first, second and ninth segments the largest. General colour of abdomen bright red, variegated with white laterally, the white markings more pronounced anteriorly. Narrow posterior margin of first and second

segments white. Antennæ dull reddish, lighter at the joints. Legs dull reddish, dusky distally. Beak dusky.

Stage IV.—Length, 2.5 mm. Head and thorax as in preceding stage, except the red is darker and the median line is whitish. Narrow posterior margin of prothorax bright red. The wing-pads extend to the third segment. Abdominal marking as in preceding stage, except that the median reddish-brown areas are larger, and all but the anterior margin of the ninth segment is of this colour. Legs, antennæ and beak darker than in the last stage.

Stage V.—Length, 4.3 mm. Head and thorax dull black over a red ground colour. Median line of thorax whitish. First and second abdominal segments nearly black over reddish, posterior margin of each white; third to eighth segments light red, variegated with lighter markings, and there is a median longitudinal row of large transverse reddish black spots. Ninth and tenth segments reddish-black except the red anterior margin. Legs and antennæ nearly black, with a reddish ground colour. Abdomen beneath lighter red, with a submarginal row of small black spots; ninth ventral segment nearly covered by a large black spot; a smaller one on the eighth.

L. mendax.

Stage I.—Length, 1.5 mm. General colour tomato-red. A distinct whitish ring around eye. Thorax slightly dusky over a red ground colour. Legs dusky, antennæ brownish, beak colourless, with the tip black. Whole dorsal surface clothed with short stiff black hairs.

Stage II.—Length, 2.5 mm. Very similar to last stage. Antennæ dusky brown, last segment lighter except at base. Tylus dark.

Stage III.—Length, 2.5 mm. The wing-pads just begin to show on the mesothorax. Coxæ tomato-red, rest of legs and beak translucent, slightly dusky; posterior tibiæ brownish. Tylus dark brown. Legs clothed with stiff black hairs.

Stage IV.—Length, 3.25 mm. Very similar to last stage in colour. The wing-pads extend nearly to the posterior margin of the second abdominal segment.

Stage V.—Length, 4 mm. Wing-pads extend to fifth abdominal segment. General colour bright tomato-red, tip of wing-pads and line along scutellum dusky. Legs dusky, darker towards the tip. Antennæ dusky, nearly black; last segment brownish at base. Tylus jet black.

Last two abdominal segments with a broad median dusk mark on the dorsum. Whole body clothed with short, fine, black hairs.

Oviposition has not been observed, but probably takes place during June and July, but in the case of *L. mendax* it may be deferred till September, as Reuter records adult specimens captured during that month.

I have reared the nymphs of both species from apple branches sent in from Brockport, Syracuse, Albany, Waterloo, East Palmyra, Lafayette, and Batavia, N. Y. In some apple orchards they are serious pests, deforming with their feeding punctures a large proportion of the fruit of certain varieties.

A NEW SPECIES OF PHALANGIDA FROM MISSOURI.

BY CYRUS R. CROSBY, ITHACA, N. Y.

Nemastoma dasyncnemum, n. sp.—Length, .95 mm.; width of abdomen, .59 mm. General colour in alcohol very dark brown, in life nearly black; in one specimen the body is distended, making it appear white, with black markings, but in the other, which was studied alive, this is not the case.

Cephalothorax squarely truncate in front, with the lateral angles oblique when viewed from above. Eyes small, situated on a low tubercle close to the anterior margin, separated by a little less than their diameter, each one surrounded by a series of sharp black spines. Frontal pieces of the cephalothorax two in number, transverse, contiguous and gradually enlarged laterally. Two-thirds the distance from the eyes to the posterior margin of the cephalothorax there is a distinct transverse groove, which becomes indistinct at the sides. In the distended specimen the thickened parts of the tegument are separated from each other and contrast sharply with the snow-white connecting membrane. The first five dorsal abdominal segments are united into a single piece, free from the cephalothorax, and with the anterior and posterior margins convex. The sixth, seventh and eighth dorsal segments are represented by narrow, transverse sclerites. On the ventral side five segments are distinguishable. The first is large, narrowed in front and separated from the terminal portion by a

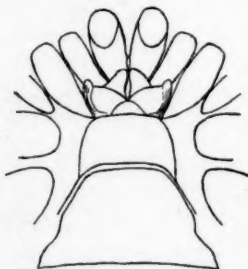


FIG. 1.—Ventral view of mouth-parts

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distinct suture ; terminal portion rectangular, with the anterior margin slightly convex. Second, third and fourth segments linear, fifth much wider. The anal piece consists of three parts: the superior part (pygidium) semicircular, the two lateral anal valves small and triangular ; the anal sternite represented by a small dark spot scarcely hardened. Between the ends of the fifth ventral and eighth dorsal segments there is on each side a small, irregularly-shaped sclerite. The hardened parts are brown, with the surface slightly roughened by minute tubercles ; certain areas are, however, armed with larger tubercles less thickly placed, as follows : The entire cephalothorax, except the area between the eye tubercle and the transverse groove ; a large quadrate area on the anterior part of the large dorsal plate, indistinctly divided into three parts ; two transverse areas behind this ; narrow transverse areas on the sixth, seventh and eighth dorsal segments ; the entire surface of the pygidium, and the posterior part of the first ventral segment.

Coxæ of nearly equal length, trochanters globular, both are dark brown and armed with short black spines. Base of femur white and unarmed, rest of femur, patella and tibia brown, and armed with short acute perpendicular spines and long slender hairs, which in their basal half are at right angles to the segment, and in their distal half bent forward and somewhat matted together. The other segments pale, thinly clothed with slender oblique spines and very fine appressed hairs. Each tibia armed at the tip above with a short, stout, slightly curved, tooth-like spine. Tarsal claws unarmed.

Palpus long and slender, sparsely clothed with short, erect setæ ; trochanter armed below with three longer recurved setæ ; tarsus slightly clavate and more thickly clothed with setæ than the other segments. Chelicerae light gray, the claw armed with a series of fourteen teeth, of which the terminal two are the largest ; the opposing figure armed with about ten similar teeth. Preëpistome broad, convex and strongly chitinized, epistome produced into a sharp vertical ridge. Endites of the palpus white, triangular, with the outer margins slightly convex. Endites of the first pair of legs with a chitinized lateral border, curved and enlarged distally, inner portion white, with the anterior margin convex ; situated between them is a small semicircular sclerite, which seems to represent the sternum. Coxæ of the second pair distant from sternum and not provided with endites. (Fig. 1.)

In the following table the length of the segments of the legs and the palpus is given in millimeters. Owing to the difficulty of determining the division between the tarsi and the metatarsi because of the presence of several false articulations, I have for convenience in the table considered the first segment after the tibia as representing the metatarsus, the remaining segments the tarsus.

LEGS.	I.	II.	III.	IV.	PALPUS.
Tar.....	.13 .1 .24	.16 .13 .15 .25	.09 .06 .06 .24	.07 .06 .09 .27	.27
Total47	.69	.45	.49	
Met39	.57	.4	.57	
Tib.....	.4	.66	.43	.64	.43
Pat.....	.13	.13	.13	.15	.4
Fem.....	.55	.72	.48	.64	.52
Tro.....					.24

Three specimens, Columbia, Mo., November 8 and 20, 1904, July 12, 1905, collected under leaves on a heavily wooded north slope on the bank of Hinkson Creek.

I place this species in *Nemastoma* for the present, although it differs from it in the separation of the dorsal plate of the cephalothorax from the tergites of the abdomen, the presence of a transverse groove on the cephalothorax back of the eye tubercle, the exposure of the stink glands, the suppression of the anal sternite, and the dentition of the digits of the chelicerae.

RANDOM NOTES ON ENTOMOLOGICAL FIELD WORK.*

BY E. S. TUCKER,

Bureau of Entomology, U. S. Dept. Agric.

Opportunities often occur in entomological field work for the observation of interesting features of insect life apart from the main subject of investigation. Such features in many cases are presented in connection with the regular observations, but independently as time permits, casual

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attention at least can frequently be given to occurrences none the less worthy of record. My practice of keeping on the lookout for all kinds of insects or their work has led to some important economic discoveries, but my present paper is prepared with the object of bringing together some miscellaneous results for reference.

In several instances my specimens were submitted through Dr. L. O. Howard to experts in the Bureau, and his prompt attention and courtesy in furnishing reports of their determinations have greatly aided me. Each authority is given credit for such helpful assistance.

INSECTS TAKEN IN DRY COTTON BOLLS.

While making search for hibernated cotton-boll weevils, *Anthonomus grandis* Boh., other insects and a few myriapods have been taken under the same conditions, but not all of the specimens thus obtained have been specifically determined. However, the results of my collecting in two lower Red River localities of Louisiana may throw light upon the winter habits of certain species, as follows.

Old cotton bolls collected at Alexandria, La., February 26 and 27, 1909, harbored the forms here listed in addition to the boll weevil.

COLEOPTERA.

Apocellus gracilicornis Casey.—(Det. H. S. Barber.) Adult in fallen boll.

Apocellus sphaericollis Say.—Common. Adult in fallen boll.

Atenius abditus Hald.—(Det. E. A. Schwarz.) Adult in fallen boll.

Myochrous denticollis Say.—(See Additional Records.) Adult in fallen boll.

Anthicus confusus Lec.—(Det. H. S. Barber.) Adult in fallen boll.

Eudiagogus rosenschaldi Fah.—Adult in abandoned cell of boll weevil in fallen boll.

Baris ærea Boh.—Adult in fallen boll.

Aracrus fasciculatus De G.—Actively breeding in both hanging and fallen bolls, all stages from larvæ to adults; pupæ in one fallen boll attacked by mites, *Tyroglyphus breviceps* Banks. (See Additional Records.)

MYRIAPODA.

A few myriapods were found in rotten bolls on the ground. Their partial identifications by Mr. Nathan Banks are as follows: "The myriapods belong to three different genera, one near *Polydesmus*, one near *Julus*,

and one near *Lithobius*. The *Polydesmus* and *Julus* are vegetarians, the *Lithobius* is carnivorous."

Similar bolls collected at Mansura, La., March 1 and 2, 1909, directly after my visit at Alexandria, were found to harbour quite different species, and the list affords an interesting comparison.

COLEOPTERA.

Bradycellus rupestris Say.—Adult in fallen boll.

Melanophthalmus simplex Lec.—(Det. H. S. Barber.) Adults in hanging bolls.

Acylomus ergoti (Walsh) Casey.—Adults in hanging bolls.

Megilla maculata De G.—Adults in hanging bolls.

Cathartus cassiae Reiche [*gemellatus* Duv.].—Adults in hanging bolls. (See Additional Records.)

Cerotoma trifurcata Forst.—Adult in fallen boll.

Cassida bivittata Say.—Adult in hanging boll.

Anthicus fulvipes Laf.—(Det. H. S. Barber.) Adult in hanging boll. One emerging March 24, in isolation.

Tyloderma dentipes Pierce MS.—Adult in hanging boll.

Aræcerus fasciculatus De G.—Breeding in both hanging and fallen bolls, as at Alexandria.—(See additional Records.)

OTHER ORDERS.

Dicymolomia julianalis Wk.—(Det. H. G. Dyar.) A larva in hanging boll damaged by *Aræcerus fasciculatus* matured after isolation in a breeding jar. So far as known to me, the only published record of the occurrence of this lepidopterous species in cotton bolls is the statement of Dr. Dyar in Proc. Ent. Soc. Wash., v. XI, 1909, p. 66, though in habits it is considered as a scavenger.

Batrachetia Rileyi Wishm.—Larvæ of this moth were frequently found in fallen bolls associated with and without *Aræcerus fasciculatus* or its work. The larva is supposed to feed on insect remains. (See Additional Records.)

Cremastogaster lineolata Say, subsp. *leviuscula* Mayr, var. *clara* Mayr.—A solitary female of this ant in hanging boll, and five incipient colonies, composed of female, workers and young larvæ, in similar bolls.

Doru luteipennis Serv.—(Det. A. N. Caudell.) Adults of this earwig in both hanging and fallen bolls.

Schænomyza chrysostoma Lw.—(Det. D. Coquillett.) Adult fly from hanging boll emerged in breeding jar, March 19.

INSECTS TAKEN IN DRY CORNSTALKS.

Examinations of cornstalks in the same localities and on the same dates as mentioned for cotton bolls failed to disclose a single cotton-boll weevil, although the finding of this insect in stalk cavities probably formed by *Aræcerus fasciculatus* had been previously reported by the overseer of a plantation near Alexandria. The latter species was found to have bred extensively in the stalks, a large proportion of which, in consequence, presented a riddled condition on account of emergence holes opening from the larval excavations in the pith. These cavities afforded attractive retreats for other species, mainly in hibernation, and including common weevils that are apt to be mistaken for boll weevils.

The species thus found at Alexandria, La., are herewith recorded.

COLEOPTERA.

Languria mozardi Lat.—Adults mostly in cavities of *Aræcerus fasciculatus*.

Silvanus bidentatus Fabr.—Adults all in *Aræcerus* cavities. (See Additional Records.)

Paromalus conjunctus Say.—Adults in broken stalks on ground.

Carpophilus hemipterus L.—Adult in *Aræcerus* cavity.

Moncrepidius bellus Say.—Adults in broken stalks on ground.

Atenius abditus Hald.—(Det. E. A. Schwarz.) Adult in broken stalk on ground.

Atenius cognatus Lec.—(Det. H. S. Barber.) Adult in broken stalk on ground.

Myochrous denticollis Say.—Adults rather common in *Aræcerus* cavities. (See Additional Records.)

Chaetocnema denticulata Ill.—Adult in *Aræcerus* cavity.

Tanymecus confertus Gyll.—Adult in *Aræcerus* cavity.

Eudigogus rosenschaldi Fah.—Adults in broken stalks on ground.

Chalcodermus æneus Boh.—In one field wholly in *Aræcerus* cavities; cowpeas had been grown in this corn field. In another field, found in broken stalks not attacked by *Aræcerus fasciculatus*. Common, and apt to be mistaken for the boll weevil.

Calandra oryzae L.—Adults commonly found in stalks not attacked, as well as in *Aræcerus* cavities. Apt to be mistaken for the boll weevil. (See Additional Records.)

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Atenius cognatus Lec.—(Det. H. S. Barber.) Adult in broken stalk on ground.

Myochrous denticollis Say—Adults rather common in *Aracerus* cavities. (See Additional Records.)

Chaetocnema denticulata Ill.—Adult in *Aracerus* cavity.

Tanymecus confertus Gyll.—Adult in *Aracerus* cavity.

Endigogus rosenschaldi Fah.—Adults in broken stalks on ground.

Chalcodermus æneus Boh.—In one field wholly in *Aracerus* cavities; cowpeas had been grown in this corn-field. In another field, found in broken stalks not attacked by *Aracerus fasciculatus*. Common, and apt to be mistaken for the boll weevil.

Calandra oryzae L.—Adults commonly found in stalks not attacked, as well as in *Aracerus* cavities. Apt to be mistaken for the boll weevil. (See Additional Records.)

Stephanoderes, near *hispidulus* Lec.—(Det. A. D. Hopkins.) Two adults in dry stalks on ground, the stalks being perforated by fine pin-hole channels made by the beetles. (See Additional Records.)

OTHER ORDERS.

Cremastogaster lineolata Say, subsp. *laviuscula* Mayr, var. *clara* Mayr. These ants occurred in *Aræcerus* cavities.

Cælioxys rufitarsis Sm.—Two leaf-rolled pupal cells of a *Megachile* bee were found in pith of dry stalk on ground; a male *Cælioxys rufitarsis* emerged from one cell March 30, and dissection of the other cell disclosed a nearly matured male of same parasitic bee in its own pupal case within the *Megachile* pupal case.

Geocorus punctipes Say.—(Det. O. Heidemann.) Adult bug in stalk attacked by *Aræcerus fasciculatus*.

Cardiastethus assimilis? Reut.—(Det. O. Heidemann.) Adult bug in stalk attacked by *Aræcerus fasciculatus*.

ADDITIONAL RECORDS OF INSECTS FROM COTTON AND CORN.

A number of species already mentioned have been taken at other times either hibernating in or attacking the same host-plants, and the following additional records are given, including mention of further species in relative connection.

Silvanus bidentatus Fabr.—Found in dry standing cornstalks at Alexandria, La., during my first examination for *Aræcerus fasciculatus*, September 18, 1908.

Cathartus cassiæ Reiche [*gemellatus* Duv.]—Collected on matured cornstalks and a damaged ear at Alexandria, La., September 18, 1908, and besides was reared from stalks attacked by *Aræcerus fasciculatus* in same field, emerging October 29. At Sherman, Tex., on November 25 of the same year, the species occurred in dried cotton boll. Mr. J. D. Mitchell found it in old cornstalks attacked by *Aræcerus fasciculatus*, at Victoria, Tex., March 6, 1909.

Typhæa stercorea L. [*fumata* L.].—Reared from corn ear collected in field at Shreveport, La., September 24, 1908, emerging October 3.

Carpophilus dimidiatus Fabr.—(Det. H. S. Barber.) Collected on corn ear in field at Alexandria, La., August 2, 1909.

Conotelus stenoides Murr.—Taken in dried cotton boll at Sherman, Tex., November 25, 1908.

Ligyris rugiceps Lec.—At Gurdon, Ark., on June 25 of the present year, field corn was found to have suffered greatly from attacks of this beetle, specimens of which were dug from the ground close to the corn roots. The injuries were primarily caused by ragged wounds gnawed in base of stalks, usually just above the roots, but also beneath them at the extreme base. Two plantings reported ruined in this manner, and the third was being worked on. Only casual examination made owing to limited time, but enough seen and learned to prove extensive damage.

Myochrous dentibollis Say.—Common on cotton squares and green cornstalks at Shreveport, La., September 24–25, 1908; and on green corn at Alexandria, La., August 2, 1909. At Plano, Tex., on April 3, 1909, a field of corn with sprouts about four inches high was found badly damaged by the beetles, the tender leaves being eaten through in irregular holes and the stems gnawed. Some plants had stems broken at point weakened by attack. The beetles were found hiding in the earth around base of stems. Three counts of a number of plants gave the following percentage of injured ones: in middle of field, 50%; between middle and edge, 25%; near edge, 12%; average damage, 29%. Slight injuries were observed in a near field of same farm, but on another farm no attacks were noticed, though in this case the plants had barely appeared aboveground. At the same place on May 5, the fields having been replanted owing to complete loss of first planting on account of frost, similar damage was noticed to a slight extent, but the beetles had become scarce.

Tribolium ferrugineum Fabr.—Matured May 5, 1909, from dry cornstalks attacked by *Aracerus fasciculatus*, collected at Alexandria, La., September 18, 1908; also taken from similar stalks at Victoria, Tex., March 6, 1909, by Mr. J. D. Mitchell.

Calandra oryzae L.—Adult found inside a leaf sheath on matured cornstalk, September 18, 1908, at Alexandria, La.

Aracerus fasciculatus De G.—For report of discovery in cornstalks, and other particulars, see "New breeding records of the coffee-bean weevil" (U. S. Dept. Agric., Bu. Ent., Bul. 64, pt. VII), and further records, "Additional notes upon the breeding of the coffee-bean weevil" (Jour. Econ. Ent., v. 2, No. 6, 1909, pp. 373–381).

Hypothenemus sp. and *Stephanoderes*, near *hispidulus* Lec.—(Det. A. D. Hopkins). Specimens of minute beetles and pieces of dry cornstalks were received from Mr. J. D. Mitchell, at Victoria, Tex., under date of

March 6, 1909. The stalks showed openings of minute tunnels, greatly resembling pin holes. These holes appeared on one stalk otherwise perforated by *Aracerus fasciculatus*. Dr. Hopkins reported that the specimens taken from the stalks constituted two apparently undescribed species as designated. His remark will also apply to the *Stephanoderes* specimens collected by me at Alexandria, La., as previously mentioned. Similar work by these insects was later found by me in an upper joint of a green cornstalk, which, however, was beginning to mature, being found at Alexandria, La., August 2, 1909.

Butratchetra Rileyi Wlsh. — (Det. A. Busck.) In cornstalks infested by *Aracerus fasciculatus*, or where it had worked and left, and decay had begun, numbers of the pink larvæ of this moth were living. They occurred particularly in rotting, rain-soaked stalks. Collected at Alexandria, La., September 18, 1908; adults matured in breeding cage on October 22 and 29. Larvæ also found frequently associated with or following the work of *Aracerus fasciculatus* in green cornstalks, and sometimes in ear tips injured by corn-worm, *Heliothis obsoleta* Fabr., at same place, August 2, 1909. Mr. J. D. Mitchell submitted pupal cases taken from *Aracerus* cavities in cornstalks at Victoria, Tex., March 7, 1909.

Monorium carbonarium F. Sm. — (Det. R. A. Cushman.) These ants were found by Mr. J. D. Mitchell in the cells of *Aracerus fasciculatus* in old cornstalks at Victoria, Tex., March 7, 1909.

Pterodela pedicularis L. — (Det. N. Banks). This Psocid bred in dry cornstalks attacked by *Aracerus fasciculatus*, collected at Alexandria, La., September 18, 1908. Adults were taken in breeding cage October 29, and April 14 following.

Chetopsis ænea Wd. — (Det. D. W. Coquillett.) Adult flies emerged August 10 and 23, from green cornstalks collected August 2, 1909, at Alexandria, La. The larvæ appeared to be associated with or following the work of *Aracerus fasciculatus* in lower joints, occurring generally in spots at node or base of leaves.

Oscinis carbonaria Lw. — Adult flies emerged August 10 from green stalks as in preceding case, though apparently independent of *Aracerus fasciculatus* attacks.

Oscinis trigamma Lw. — (Det. D. W. Coquillett.) Two adult flies emerged from old cotton boll, Dallas, Tex., March, 1909.

Gryllus Pennsylvanicus Burm. — A body of this cricket was found impaled evidently by a loggerhead shrike, otherwise called the southern

butcherbird, on an open prong of an empty hanging cotton boll in field of old stalks, at Wolfe City, Tex., January 20, 1909. This record affords interest from the fact that cotton bolls may be utilized in such manner in place of thorns or wire-fence barbs. The cricket had been pierced sideways in the thorax by the point of the boll.

Geocoris bullatus Say.—See "Propensity of Plant-bugs for Biting Persons."

Atomoscelis sericatus Reut.—See "Propensity of Plant-bugs for Biting Persons."

ARACHNIDS FROM SPANISH MOSS.

In further connection with the hibernation of boll weevils, a quantity of Spanish moss, *Tillandsia usneoides* L., was examined at Natchez, Miss., during the middle of May, 1909. The few insects found besides the boll weevil have not yet been studied, but the arachnids have been identified by Mr. Nathan Banks, as follows :

Liobunum vittatum Say.

Zelotes sp. (immature).

Anyphæna fallens Htz.

Theridium spirale Emer.

Granmonota maculata Bks.

Philodromus pernix, Blk.

Dendryphantès octavus Htz.

PROPENSITY OF PLANT-BUGS FOR BITING PERSONS.

Several times during August, 1909, at Dallas, Tex., I was annoyed by being bitten on my hands by little green leafhoppers, which bounded away as soon as I gave a jerk on feeling the bite. These insects entered my room at night through the screens of open windows, being attracted by electric lights above my desk. Early in September specimens were captured in the act of biting me, and their identification by Mr. O. Heide-mann was reported as *Empoasca mali* Le B. The same species was again detected in biting me during July, 1910, and subsequently another occasion was presented for observing its attack from start to finish. This last occurrence happened on the night of October 2. From the time my attention was first attracted by feeling the bite until the insect desisted, a trifle over four minutes elapsed according to my watch. The insect was then captured, and after being crushed on a white sheet of paper, a faint bloody streak was produced, which proved beyond any doubt that the specimen had actually engorged itself with blood.

On the night of October 5 a cool northerly wind brought a sudden decline of temperature, and myriads of small bugs invaded dwellings and late business rooms wherever lights attracted the insects and nothing barred their way besides the ineffectual screens. In swarming around the lights, they caused a distractive annoyance to persons within range of their movements, more than on any preceding night. My daughter complained that the insects bit her, and her neck showed three small lesions, each of which was the nucleus of a stinging irritation. The insects were accused of being the culprits, because she had brushed them away. A quantity of the insects which fell from the light globes and died were collected and examined next morning. Nearly all were leafhoppers, of the family Jassidæ. A few heteropterous plant-bugs were among them. The prevailing species of leafhopper was *Athysanus exitiosus* Uhl., which outnumbered *Deltocephalus inimicus* Say, at the rate of 100 to 6. *Empoasca* was much more abundant than *Deltocephalus*. Only a single specimen of another Jassid appeared in the examination.

No record of such abnormal habit concerning these insects or other related species is known to me, but two of my associates have declared that they as well as some members of their families have been bitten by leafhoppers of common size, at various times and places, even during the recent abundance of these insects at lights in Dallas.

Another bug, to which my attention was drawn on account of its stinging bite on the back of my hand, was recognized as *Triphleps insidiosus* Say. This attacked me while doing field work on May 10, 1910, at Dallas, Tex.

Still another species, which proved to be *Geocorus bullatus* Say, has been brought to notice by an associate, Mr. Harry Pinkus, who was examining cotton plants with me in a field at Plano, Tex., July 12, also in 1910, when he captured the bug in the act of biting his hand.

An additional species, which agreed with identified specimens of *Atomoscelis serieatus* Reut., belonging in the family *Miridæ* [*Capsidæ*], was taken in the act of biting the back of my hand while I was engaged in writing at my desk at night under electric lights, September 8, 1910, at Dallas, Tex. Its persistency in biting until I could obtain a cyanide bottle and capture it is strong evidence that it attempted to feed on blood, and perhaps succeeded; in fact, it seemed loth to relinquish its attack even after being enclosed by the mouth of the bottle. The bite

produced a sharp stinging sensation, much like a mosquito puncture, and left a faint pale spot on the skin. Its rostrum was distinctly perceived to be directed into my skin. The species has otherwise been collected by me at the following places in Texas: Goliad, June 16, 1908; Pearsall, July 12, 1908, taken on Croton weed; and at Dallas, August 11, 1908, on cotton.

The biting of these insects, as mentioned, may possibly be induced by mere force of habit, since they live on many kinds of plants, but in view of the supposition that they attack an animal by mistake, I had doubted up to the time of my last experiences that they would actually feed on blood. Really, I had not suffered myself to endure the stinging sensation of a bite long enough for an insect to effect more than a puncture, until my last experience took place.

MORTALITY OF AN ANTHOMYID FLY DUE TO FUNGUS.

The occurrence of dead flies hanging on the wire screening of the insectary at Dallas, Tex., attracted my attention on March 29, 1910. On examination, fungus spores were observed in clusters on the bristles of the abdomen and on the legs of the flies, which proved to be the species *Phorbia fusciceps* Zett., whose larvæ are widely injurious to roots of vegetables. Maggots, which afterwards matured as this species of fly, have been taken while depredating on bean roots in a truck patch at Dallas, Tex., April 10, 1909. The disease, however, seemed to act upon the flies during night, since the dead bodies were noticed in new places for several mornings, being found attached to the leaves of an ash tree on April 12, by Mr. H. Pinkus. Specimens were submitted to Vera K. Charles, of the Bureau of Plant Industry, Washington, D. C., who gave the following report: "The fungus is a species of *Empusa*, probably *Empusa muscæ*, Cohn. This host is not represented in our collections, nor has the fungus been reported upon it."

DANGER OF POLLUTION BY HONEYBEE.

At an open public privy in Hackett, Ark., on September 13, 1910, chickens and insects were observed to have free access from the rear to the excrement on the ground. Although lime had been used to disinfect the place, the recent deposits on top nevertheless attracted numerous flies, and among them a worker honeybee was seen investigating the polluted matter. It alighted on and examined one vile spot after another.

What significance the conduct of this bee might have in the pollution of honey in its hive can only be imagined. I learned that some hived bees were kept near town.

THE SHRUB, *CEANOTHUS OVATUS*, DESF., AS A HOST-PLANT.

On April 7, 1909, my attention was drawn to this shrub growing near Dallas, Tex., on account of the occurrence of scale insects on the main stem. The specimens were identified by Mr. J. G. Sanders as *Lecanodiaspis cellidis* Ckll., which has been found extensively infesting hackberry trees in the city. Mr. Sanders remarked that the shrub "seems to be a new food-plant for this species."

From elongate gall formations on the branches, the moth determined by Mr. A. Busck as *Stagmophora ceanothiella* Cosens, emerged on the 7th, 12th, 14th and 19th of the month.

On the flowers the moth, *Scythris albilineata* Wlsh. (det. A. Busck), was taken; also the flies, *Geron senilis* Fabr., and *Phorbia fusciceps* Zett. (both det. D. W. Coquillett); and two male sawflies identified by Mr. S. A. Rohwer as his species *Hylotoma grandis*. In addition, two species of Chrysomelid beetles were collected, their determinations being made by Mr. Frederick Knab as *Cryptocephalus notatus* Fabr., and *Diachus auratus* Fabr.

OCCURRENCE OF A LEAFROLLER ON *VIBURNUM PRUNIFOLIUM* L.

On same date and near the same place of collection as for the directly preceding records, the rolled leaves of the stag-bush or sloe, also improperly called the black haw, were found to occur extensively. These distortions were due to the work of caterpillars, one of which was enclosed or had pupated in every curled leaf. The moth, *Anacampsis rhoifrutella* Ckll. (det. A. Busck), matured from collected rolls, on May 8 and 10.

In closing these notes for the present, mention might be made concerning the unfavourable seasons of 1909 and 1910 for the collection of insects in Texas. On account of the unusual hot and dry weather which prevailed, there has been a marked restriction in the occurrence of many insects, resulting particularly in a deficiency of observations upon breeding habits. From the records and special notes herewith presented, I trust, however, that some advance in information is gained.

SOME BEES FROM WESTERN CANADA.

— BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO.

I am indebted to Dr. C. Gordon Hewitt for the loan of a small collection of bees obtained by Mr. T. N. Willing, of Regina, Saskatchewan. Although the number of species is not large, several are new to the Canadian fauna, or otherwise of interest. It is in this region that the arid transition zone enters Canada, and consequently, any one who will collect diligently there is sure to find a considerable number of species not otherwise known as Canadian. I have omitted from the list three species of *Andrena*, two from Regina and one from Mortlach. I do not recognize these at once, and it may be that some or all are new, but it does not seem worth while to spend time on them until Mr. Viereck's paper on the genus has been published.

Colletes salicicola geranii Ckll.—1 ♂, Pincher, Alta., July 10, 1904.

Halictus lerouxii ruborum Ckll.—♀, Mortlach, Sask., May 31.

Halictus trizonatus Cress.—♀, Mortlach, May 31.

Agapostemon texanus Cress.—♀, Mortlach, May 31, 1909.

Andrena cockerelli Græn.—♀, Lipton, Sask., June 5, 1907.

Halictoides maurus Cress.—♀, Kinistino, Sask., July 26, 1907.

Coelioxys ribis Ckll.—♂, Prince Albert, Sask., July 27, 1907. Like the male of *C. ribis kincaidi*, but hair a purer white, and scutellum subangulate in middle, with the lateral teeth short as in *ribis* ♀.

Osmia novomexicana Ckll.—Medicine Hat, Alta., one ♀, May 30, 1904.

Anthidium tenuifloræ Ckll.—♀, Radisson, July 29, 1907; ♂, Suks-town, July 18, 1909.

Megachile calogaster Ckll.—♀, Meota, Sask., July 8, 1906; ♀, Swarthmore, July 15, 1910; ♂, Macleod, July 2, 1904.

Megachile manifesta Cress.—♂, Davidson, Aug. 21, 1907.

Megachile (Sayaphis) pugnata Say.—♂, Radisson, July 29.

Megachile (Anthemois) infragilis Cress.—♂, Regina, July 11, 1909. A form with the light hair yellowish-white. Anterior coxæ with no spines.

Megachile relativa Cress.—Four ♀'s, three from Regina, Aug. 24, Sept. 4 and 7, one from Davidson, Aug. 21. Peculiar for having the hair on last dorsal abdominal segment partly or mainly black instead of orange.

Megachile latimanus Say.—♀, Regina, Aug. 15.

Melissodes confusa Cress.—Males from Meota, Sask., July 8; Macleod, July 8; Radisson, July 29; Prince Albert, July 28.

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Tetralonia medicata, n. sp.—♀, Medicine Hat, Alberta, May 30, 1904. Length, about $14\frac{1}{2}$ mm.; like *T. atriventris* Sm., but pygidial plate narrower (as in *fuscipes* Rob., from Washington, D. C.); hair of head (except occiput), of pleura and under part of thorax, *all black*, of thorax above creamy white; hair of legs black, or nearly, except on inner side of anterior and middle tibiae and anterior tarsi, where it is reddish, on middle tarsi, where it is red, brilliant on inner side, and the scope of hind legs, which is golden red; clypeus coarsely, irregularly punctured, with a median ridge; mesothorax dull, finely granular; mandibles with an orange patch; wings not so brown as in *atriventris* or *fuscipes*; abdomen without bands.

When working on this species, I had occasion to examine a cotype of Cresson's *Melissodes dubitata*. The specimen, which agrees excellently with the description, shows that *dubitata* is not *Tetralonia atriventris*, as has been supposed, but is a valid species of true *Melissodes*. It is readily distinguished from *T. atriventris* by the clypeal structure and sculpture (punctures very dense) and the shining mesothorax.

Anthophora bomboides Willingi, n. subsp.—♂, Prince Albert, Sask., June 18, 1905. Rather small; pale hair wholly dull white; middle of thorax with a small amount of black hair; first *two* abdominal segments with pale hair (first *three* in true *bomboides*); sides of second segment posteriorly with black; third and following with black hair; scape with a small light spot; clypeus yellow, except a crescent-shaped black mark on each side, the convexity inward, and the lower inferior corners broadly; *lateral marks reduced to narrow stripes contiguous with the black part of clypeus*; labrum yellow, except lateral and apical margins, and the usual lateral spots. Proportions of antennal joints, venation, toothed hind basitarsi, etc., normal.

A DECISION ON MEIGEN'S 1800 PAPER.

BY J. M. ALDRICH, MOSCOW, IDAHO.

In the CANADIAN ENTOMOLOGIST of October, 1908 (pp. 370-373), I published a discussion of this paper of Meigen's, to which I added a brief item the next month (p. 432). Some time afterward, learning that the International Commission on Zoological Nomenclature was accepting certain nomenclatural questions for consideration, expecting to render opinions on them, I sent to Dr. Charles Wardell Stiles, secretary of the Commission, copies of what I had published on the Meigen paper, and asked him to have the question taken up by the Commission. I did not precisely specify the question to be considered, but simply gave him my

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discussion, my idea being to ascertain whether the 1800 names would be considered valid.

The opinion of the Commission was delivered to me last May, and has lately been published among others in circular form by the Smithsonian Institution (Smithsonian Publication, No. 1989, p. 68, October, 1910).

The question is taken up in the following form:

"The question primarily before the Commission is whether Meigen's 'Nouvelle Classification' has been published or not."

Omitting the discussion, the conclusion is given in the following paragraph:

"In the face of this evidence submitted by Doctor Stejneger, it cannot be doubted that Meigen's paper has been published in the sense of the International Code, and the Secretary concurs with Doctor Stejneger in submitting to the Commission the motion that the Commission is of the opinion that the generic names in Meigen's Nouvelle Classification, 1800, must take precedence over those in his Versuch, 1803, in every case where the former are found valid under the International Code."

This motion was agreed to by eleven commissioners, four not voting; none voting in the negative.

After receiving this decision, on May 31, 1910, I wrote Mr. Stiles a letter, in which I said:

"I do not find that you have touched the point at issue. In my published articles on the matter, which I sent you, I did not dispute that the paper was published in 1800. The question is whether the 1800 names were accompanied with enough data to make them valid. And on this I still await a decision."

Mr. Stiles's reply concludes with the following paragraph:

"You summarize your point of view in the following sentence: 'The question is whether the 1800 names are accompanied with enough data to make them valid.' My view is that this is a question for you and other specialists to answer zoologically. The opinion in question as written is to the effect that they are *available*, and this is a question of the Code. Whether they are *valid* involves a question of systematic zoology, namely, can specialists recognize what is included under those names."

The foregoing facts will, I think, show that the Commission did not only not decide against my contention, but that the Secretary expressly says that the essential feature of the case does not lie within the jurisdiction of the Commission, and cannot be acted upon by them.

BOOK NOTICE.

Genera Insectorum dirigés par P. Wytsman, Coleoptera Adephaga, fam. Carabidæ, subfam. Cicindelinae, von der Walther Horn, 1910. Fascicule 82b avec planches, 6-15.

This, the second part of Dr. Horn's "Cicindelinae," has recently come from the press, and is devoted to the platysternale phylum, including the tribes Mantichorini, Megacephalini and Cicindelini. The general plan follows that indicated in the review of the first part (vide CANADIAN ENTOMOLOGIST, 1910, p. 65), but so many items of interest to American entomologists appear that it seems worth while to notice them in some detail.

Under Dr. Horn's arrangement, our genera, *Amblychila* and *Omus* (together with the South American *Pycnochila*), form the subtribe Omina of the tribe Megacephalini. Of *Amblychila*, two species are recognized, *cylindriciformis* Say (with the subspecies *picolominii* Reiche), and *baroni* Rivers (with the subspecies *Schwarzi* W. Horn), the recently described *longipes* Csy. ranking as a synonym of *baroni*. In *Omus* only three species are recognized, *dejeani* Reiche, *submetallicus* Horn, and *californicus* Esch. The first two of these are without synonymy, but the string of names assigned to subspecific or other local forms of *californicus* is a long one. Those given specific rank are (1) *vandykei* W. Horn, (2) *audouini* Reiche, (3) *ambiguus* Schpp., (4) *punctifrons* Csy., (5) *sequoiarum* Cr., (6) *fraterculus* Csy., (7) *horni* Lec., (8) *levis* Horn, (9) *edwardsi* Cr., (10) *intermedius* Leng, (11) *lecontei* Horn, (12) *fuchsi* W. Horn. This leaves about two dozen of the names applied by LeConte, W. Horn and Casey with no higher value than that of synonyms. The reviewer is bound to confess that his own series of *Omus* is too small to throw any light upon the matter. *Tetracha*, which is made a subgenus of *Megacephala*, of the subtribe Megacephalina, gets through with no change of name in our two species. The arrangement of the Cicindelini is not completed in this section, but it is divided into two subtribes, only one of which (Cicindelina) is found with us. This has not been reached, but the next part, containing it, will be looked forward to with interest and perhaps with some apprehension by subscribers to the work.

Something should be said of the plates, which are beautifully executed, and illustrate a large number of exotic forms, as well as a few from North America. As in the preceding part, a good share of the drawings are devoted to structural details. The work as a whole is to be recommended to all naturalists interested in phylogenetic studies, since it represents the views of a writer who considers the insect not as a mere separate entity, but in relation to life as a whole. H. F. WICKHAM.

Mailed January 12th, 1911.

